

DT04 Rec'd PCT/PTO 1 5 JUL 2004

AMENDMENTS TO THE CLAIMS

Page 16, line 1 replace ~~CLAIMS~~ with WE CLAIM.

Claims 1 to 80 (canceled).

Claim 81 (new). A method of separating, from a mixture of objects, objects that exhibit a specific characteristic related color of the objects, which characteristic is not detectable by the naked eye or a color camera, comprising advancing said mixture, determining, using radiation, whether a portion of said mixture exhibits said characteristic and separating from the mixture the objects exhibiting said characteristic as desired portions of the mixture.

Claim 82 (new). A method according to claim 81, wherein said determining comprises analyzing, in a plurality of narrow wavelength bands in the visible spectrum, such radiation varied by said portion.

Claim 83 (new). A method according to claim 82, in which said plurality is at least five.

Claim 84 (new). A method according to claim 82, in which each wavelength band is no more than 50 nanometers in width.

Claim 85 (new). A method according to claim 82, and of determining color of said matter and thereby whether said matter is or is not CMYK-printed matter, wherein said bands include a band in the region of 550 nanometers and a band in the region of 650 nanometers.

Claim 86 (new). A method according to claim 82, and additionally applying camera image interpretation to such varied radiation.

Claim 87 (new). A method according to claim 82, and additionally analyzing such varied radiation in the invisible wavelength spectrum.

Claim 88 (new). Apparatus comprising a device for producing advancement of a mixture of objects, a determining arrangement which uses radiation to determine whether a portion of the mixture is an object which exhibits a specific characteristic related to color of the object, which characteristic is not detectable by the naked eye or a color camera, and a separating device for separating from the mixture the objects exhibiting said characteristic as desired portions of the mixture.

Claim 89 (new). Apparatus according to claim 88, wherein said determining arrangement comprises a detecting arrangement serving to detect such radiation varied by said portion, and an analyzing arrangement serving to analyze the varied radiation in a plurality of narrow wavelength bands in the visible spectrum.

Claim 90 (new). Apparatus according to claim 89, in which said plurality is at least five.

Claim 91 (new). Apparatus according to claim 89, in which each 15 wavelength band is no more than 50 nanometers in width.

Claim 92 (new). Apparatus according to claim 89, and for use in determining color of said matter and thereby whether said matter is or is not CMYK-printed matter, wherein said bands include a band in the region of 550 nanometers and a band in the region of 650 nanometers.

Claim 93 (new). Apparatus according to claim 89, wherein said detecting arrangement comprises light sensors provided with narrow band filters.

Claim 94 (new). Apparatus according to claim 89, wherein said detecting arrangement comprises a spectrum-generating, light-dispersive element, and light sensors distributed so as to be distributed along said spectrum when generated.

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Claim 95 (new). Apparatus according to claim 94, wherein said element is a grating or a prism.

Claim 96 (new). Apparatus according to claim 89, wherein said analyzing arrangement serves to analyze also such varied radiation in the invisible wavelength spectrum.

Claim 97 (new). Apparatus according to claim 88, and further comprising a color camera and a device arranged to receive the output from said camera and to perform camera image interpretation.

Claim 98 (new). A method comprising identifying CMYK-printed matter by irradiating the matter with radiation which is varied by the matter differently if the matter is CMYK-printed than if the matter is not CMYK-printed.

Claim 99 (new). A method according to claim 98, wherein said determining includes analyzing, in a plurality of narrow wavelength bands in the visible spectrum, such varied radiation.

Claim 100 (new). A method according to claim 99, in which said plurality is at least five.

Claim 101 (new). A method according to claim 99, in which each wavelength band is no more than 50 nanometers in width.

Claim 102 (new). A method according to claim 99, wherein said bands 10 include a band in the region of 550 nanometers and a band in the region of 650 nanometers.

Claim 103 (new). Apparatus for use in identifying CMYK-printed matter, comprising a radiation-emitting arrangement serving to emit radiation which is varied by the matter differently if the matter is CMYK-printed than if the matter is not CMYK-printed, and a determining arrangement serving to determine whether the varied radiation corresponds to CMYK-printed matter.

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**Claim 104 (new).** Apparatus according to claim 103, wherein said determining arrangement comprises a detecting arrangement serving to detect the varied radiation diffusely reflected from said matter, and an analyzing arrangement serving to analyze the diffusely reflected radiation in a plurality of narrow wavelength bands in the visible spectrum.

**Claim 105 (new).** Apparatus according to claim 104, in which said plurality is at least five.

**Claim 106 (new).** Apparatus according to claim 104, in which each wavelength band is no more than 50 nanometers in width.

**Claim 107 (new).** Apparatus according to claim 104, and for use in determining color of said matter and thereby whether said matter is or is not CMYK-printed matter, wherein said bands include a band in the region of 550 nanometers and a band in the region of 650 nanometers.

**Claim 108 (new).** Apparatus according to claim 104, wherein said detecting arrangement comprises light sensors provided with narrow band filters.

**Claim 109 (new).** Apparatus according to claim 104, wherein said detecting arrangement comprises a spectrum-generating, light-dispersive element, and light sensors distributed so as to be distributed along said spectrum when generated.

**Claim 110 (new).** Apparatus according to claim 109, wherein said element is a grating or a prism.

**Claim 111 (new).** A method of separating, from a mixture of objects, CMYK-printed objects from objects which are not CMYK-printed, comprising advancing said mixture, determining, using radiation, whether a portion of said mixture is a CMYK-printed object, and separating from the mixture the CMYK-printed objects as desired portions of the mixture.

Claim 112 (new). A method according to claim 111, wherein said determining comprises analyzing, in a plurality of narrow wavelength bands in the visible spectrum, such radiation diffusely reflected from said portion.

Claim 113 (new). A method according to claim 112, in which said plurality is at least five.

Claim 114 (new). A method according to claim 112, in which each wavelength band is no more than 50 nanometers in width.

Claim 115 (new). A method according to claim 112, and of determining color of said matter and thereby whether said matter is or is not CMYK-printed matter, wherein said bands include a band in the region of 550 nanometers and a band in the region of 650 nanometers.

Claim 116 (new). Apparatus comprising a device for producing advancement of a mixture of CMYK-printed objects and objects which are not CMYK-printed, a determining arrangement which uses radiation to determine whether a portion of the mixture is a CMYK-printed object, and device for separating from the mixture the CMYK-printed objects as desired portions of the mixture.

Claim 117 (new). Apparatus according to claim 116, wherein said determining arrangement comprises a detecting arrangement serving to detect such radiation diffusely reflected from said portion, and an analyzing arrangement serving to analyze the diffusely reflected radiation in a plurality of narrow wavelength bands in the visible spectrum.

Claim 118 (new). Apparatus according to claim 117, in which said plurality is at least five.

Claim 119 (new). Apparatus according to claim 117, in which each wavelength band is no more than 50 nanometers in width.

**Claim 120 (new).** Apparatus according to claim 117, and for use in determining color of said matter and thereby whether said matter is or is not CMYK-printed matter, wherein said bands include a band in the region of 550 nanometers and a band in the region of 650 nanometers.

**Claim 121 (new).** Apparatus according to claim 117, wherein said detecting arrangement comprises light sensors provided with narrow band filters.

**Claim 122 (new).** Apparatus according to claim 117, wherein said detecting arrangement comprises a spectrum-generating, light-dispersive element, and light sensors distributed so as to be distributed along said spectrum when generated.

**Claim 123 (new).** Apparatus according to claim 122, wherein said element is a grating or a prism.

**Claim 124 (new).** A method of sorting a mixture of objects into respective fractions each having one or more characteristics common to the fraction, comprising determining the fraction to which any one object belongs by exposing the objects to radiation which is varied by the object and subjecting the varied radiation to camera image interpretation and to spectral analysis in the visible wavelength spectrum.

**Claim 125 (new).** A method according to claim 124, and further comprising subjecting such varied radiation to spectral analysis in the invisible wavelength spectrum.

**Claim 126 (new).** A method according to claim 124, wherein said spectral analysis in the visible wavelength spectrum is in a plurality of narrow wavelength bands in the visible spectrum.

**Claim 127 (new).** Apparatus for use in sorting a mixture of objects into respective fractions each having one or more characteristics common to the fraction, comprising a color camera, an arrangement which applies camera image interpretation to radiation which has been varied by the objects, and a spectral analyzer operable in the visible wavelength spectrum to analyze radiation which has been varied by the objects and is in the visible wavelength spectrum.

**Claim 128 (new).** Apparatus according to claim 127, and further comprising a spectral analyzer operable in the invisible wavelength spectrum to analyze radiation which has been varied by the objects and is in the invisible wavelength spectrum.

**Claim 129 (new).** Apparatus according to claim 127, wherein said spectral analyzer operable in the visible wavelength spectrum performs analysis in a plurality of narrow wavelength bands in the visible spectrum.

**Claim 130 (new).** A method of sorting matter, including advancing the matter, and determining color and/or composition of the advancing matter by irradiating the matter with radiation which is varied by the matter, and analyzing the varied radiation in at least five narrow wavelength bands in the visible spectrum.

**Claim 131 (new).** A method according to claim 130, in which each wavelength band is no more than 50 nanometers in width.

**Claim 132 (new).** A method according to claim 130, and of determining color of said matter and thereby whether said matter is or is not CMYK-printed matter, wherein said bands include a band in the region of 550 nanometers and a band in the region of 650 nanometers.

**Claim 133 (new).** A method according to claim 130, and of determining color and/or composition characteristic(s) that are not detectable by the naked eye or by a color camera.

Claim 134 (new). A method according to claim 130, and additionally applying camera image interpretation to such varied radiation.

Claim 135 (new). A method according to claim 134, wherein uncoated brown cellulosic material is identified and/or uncoated grey cellulosic material is identified.

Claim 136 (new). A method according to claim 134, wherein colored or tinted paper or board is identified.

Claim 137 (new). A method according to claim 130, and additionally analyzing such varied radiation in the invisible wavelength spectrum.

Claim 138 (new). A method according to claim 137, and additionally applying camera image interpretation to such varied radiation, wherein coated brown cellulosic material is identified and/or coated grey cellulosic material is identified.

Claim 139 (new). A method according to claim 137, and additionally applying camera image interpretation to such varied radiation, wherein printed board is identified.

Claim 140 (new). Apparatus for use in sorting matter, including an advancing device for advancing the matter, a radiation-emitting device serving to emit radiation which is varied by the advancing matter, a detecting arrangement serving to detect the varied radiation, and an analyzing arrangement serving to analyze the varied radiation in at least five narrow wavelength bands in the visible spectrum in order to determine color and/or composition of the matter.

Claim 141 (new). Apparatus according to claim 140, in which each wavelength band is no more than 50 nanometers in width.



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Claim 142 (new). Apparatus according to claim 140, and for use in determining color of said matter and thereby whether said matter is or is not CMYK-printed matter, wherein said bands include a band in the region of 550 nanometers and a band in the region of 650 nanometers.

Claim 143 (new). Apparatus according to claim 140, wherein said detecting arrangement comprises light sensors provided with narrow band filters.

Claim 144 (new). Apparatus according to claim 140, wherein said detecting arrangement comprises a spectrum-generating, light-dispersive element, and light sensors distributed so as to be distributed along said spectrum when generated.

Claim 145 (new). Apparatus according to claim 144, wherein said element is a grating or a prism.

Claim 146 (new). Apparatus according to claim 140, and further comprising a color camera and a device arranged to receive the output from said camera and to perform camera image interpretation.

Claim 147 (new). Apparatus according to claim 140, wherein said analyzing arrangement serves to analyze also such varied radiation in the invisible wavelength spectrum.

Claim 148 (new). A method of separating a de-inkable class of recyclable paper from unwanted material, comprising advancing a mixture comprised of said de-inkable class of recyclable paper and said unwanted material, determining, using radiation, whether a portion of said mixture is of said de-inkable class, and separating from the mixture the de-inkable class of recyclable paper as desired portions of the mixture.

Claim 149 (new). A method according to claim 148, wherein said determining comprises analyzing, in a plurality of narrow wavelength bands in the visible spectrum, such radiation diffusely reflected from said portion.

Claim 150 (new). A method according to claim 149, in which said plurality is at least five.

Claim 151 (new). A method according to claim 149, in which each wavelength band is no more than 50 nanometers in width.

Claim 152 (new). A method according to claim 149, and of determining color of said portion and thereby whether said portion is or is not of said de-inkable class, wherein said bands include a band in the region of 550 nanometers and a band in the region of 650 nanometers.

Claim 153 (new). Apparatus comprising a device for producing advancement of a mixture of a de-inkable class of recyclable paper and unwanted material, a determining arrangement which uses radiation to determine whether a portion of the mixture is of said de-inkable class, and a device for separating from the mixture the said de-inkable class of recyclable paper as desired portions of the mixture.

Claim 154 (new). Apparatus according to claim 153, wherein said determining arrangement comprises a detecting arrangement serving to detect such radiation diffusely reflected from said portion, and an analyzing arrangement serving to analyze the diffusely reflected radiation in a plurality of narrow wavelength bands in the visible spectrum.

Claim 155 (new). Apparatus according to claim 154, in which said plurality is at least five.

Claim 156 (new). Apparatus according to claim 154, in which each wavelength band is no more than 50 nanometers in width.

Claim 157 (new). Apparatus according to claim 154, and for use in determining color of said portion and thereby whether said portion is or is not of

said de-inkable class, wherein said bands include a band in the region of 550 nanometers and a band in the region of 650 nanometers.

Claim 158 (new). Apparatus according to claim 154, wherein said detecting arrangement comprises light sensors provided with narrow band filters.

Claim 159 (new). Apparatus according to claim 154, wherein said detecting arrangement comprises a spectrum-generating, light-dispersive element, and light sensors distributed so as to be distributed along said spectrum when generated.

Claim 160 (new). Apparatus according to claim 159, wherein said element is a grating or a prism.